

CPC**COOPERATIVE PATENT CLASSIFICATION****E21F****SAFETY DEVICES, TRANSPORT, FILLING-UP, RESCUE, VENTILATION, OR DRAINING IN OR OF MINES OR TUNNELS****Guide heading:** Ventilation of mines or tunnels**E21F 1/00****Ventilation of mines or tunnels****Distribution of ventilating currents** (ventilating rooms or spaces in general [F24F](#))

- E21F 1/003 . {Ventilation of traffic tunnels (during construction [E21F 1/04](#) to [E21F 3/00](#)) }
- E21F 1/006 . {Ventilation at the working face of galleries or tunnels }
- E21F 1/02 . Test models (analogue computers therefor [G06G 7/50](#))
- E21F 1/04 . Air ducts (suspension devices [E21F 17/02](#))
- E21F 1/06 . . Duct connections (tube connections in general [F16L](#))
- E21F 1/08 . Ventilation arrangements in connection with air ducts, e.g. arrangements for mounting ventilators ({[E21F 1/003](#) takes precedence }; ventilators in general [F04D](#))
- E21F 1/085 . . {using compressed gas injectors }
- E21F 1/10 . Air doors ({[E21F 1/003](#) takes precedence; air locks [E21F 1/145](#); dam doors [E21F 17/12](#) }; doors in general [E06B](#))
- E21F 1/12 . . Devices for automatically opening air doors
- E21F 1/14 . Air partitions
Air locks ({[E21F 1/003](#) takes precedence }; dams [E21F 17/103](#); air locks for foundations [E02D](#))
- E21F 1/145 . . {Air locks (air doors [E21F 1/10](#); dam doors [E21F 17/12](#)) }
- E21F 1/16 . Shaft covers
- E21F 1/18 . Gravity flow ventilation ([E21F 1/02](#) to [E21F 1/16](#) take precedence)

E21F 3/00**Cooling or drying of air** (air-conditioning rooms or spaces in general [F24F](#))**Guide heading:** Safety devices (flue-gas indicators [G01N](#))
Rescue devices**E21F 5/00****Means or methods for preventing, binding, depositing, or removing dust** { (in combination with mining machines [E21C 35/22](#)) }
Preventing explosions or fires (dams [E21F 17/103](#); applying liquids or other fluent materials to surfaces in general [B05](#))

- E21F 5/02 . by wetting or spraying
- E21F 5/04 . . Spraying barriers ([spray nipples](#), [spraying in general](#) [B05B](#) , [B05D](#) ; picks with [arrangements of fluid-spraying nozzles](#) [E21C 35/187](#))
- E21F 5/06 . . Fluids used for spraying
- E21F 5/08 . Rock dusting of mines
Depositing other protective substances
- E21F 5/10 . . Devices for rock dusting
- E21F 5/12 . . Composition of rock dust
- E21F 5/14 . Fluid barriers or rock dusters made to work by, or at the same time as, shots or explosions
- E21F 5/143 . . {Fluid barriers }
- E21F 5/146 . . {Rock dusters }
- E21F 5/16 . Layers of hygroscopic or other salts deposited on floors, walls, or the like, for binding dust
Deposition of such layers ([dust-absorbing materials in general](#) [C09K 3/22](#))
- E21F 5/18 . Impregnating walls, or the like, with liquids for binding dust { ([injections for improving soil or rock](#) [E21D 9/001](#); [borehole closures](#), i.e. packers, for use during the injection process [E21B 33/12](#)) }
- E21F 5/20 . Drawing-off or depositing dust ([dust-removing while drilling](#) [E21C 7/00](#); while slitting [E21C 35/22](#))
- E21F 7/00** **Methods or devices for drawing- off gases with or without subsequent use of the gas for any purpose**
- E21F 9/00** **Devices preventing sparking of machines or apparatus** ([preventing sparking of electric machines or apparatus](#) [H01K](#) , [H02K](#))
- E21F 11/00** **Rescue devices or other safety devices, e.g. safety chambers, escape ways** ([respiratory apparatus](#) [A62B 7/00](#); [revival apparatus](#) [A62B 33/00](#); [breathing aids for curative purposes](#) [A61H 31/00](#))
- E21F 13/00** **Transport specially adapted to underground conditions** ([mine cars](#) [B61D](#) ; [transport in general, loading](#) {[unless specially adapted to underground conditions](#) } [B65G](#))
- E21F 13/002 . {Crushing devices specifically for conveying in mines }
- E21F 13/004 . {Staff transport system }
- E21F 13/006 . {Equipment transport systems }
- E21F 13/008 . . {for mine roof support units for step-by-step movement }
- E21F 13/02 . {Transport of mined mineral } in galleries
- E21F 13/025 . . {Shuttle cars }

- E21F 13/04 . {Transport of mined material } in gravity inclines in staple or inclined shafts
- E21F 13/042 . . {Vertical hydraulic conveying of coal (conveying by water flow in general [B65G 53/00](#)) }
- E21F 13/045 . . {Bunkers specially adapted for mining purposes (chutes in general [B65G 11/00](#)) }
- E21F 13/047 . . {comprising helically running channels (chutes of helical form in general [B65G 11/06](#)) }
- E21F 13/06 . {Transport of mined material } at or adjacent to the working face
- E21F 13/061 . . {Chutes and braking conveyers for average and steep slopes, adapted for mining purposes (chutes in general [B65G 11/00](#)) }
- E21F 13/063 . . { Loading devices for use in mining }
- E21F 13/065 . . . {Scrapers (digging devices guided by cables [E02F 3/54](#); combined with planing means [E21C 27/42](#)) }
- E21F 13/066 . . {Scraper chain conveyers (in general [B65G 19/00](#)) }
- E21F 13/068 . . . {Special adaptations for use at the junction of the working face with the gallery, e.g. driving stations coupled to the driving station of the winning machine }
- E21F 13/08 . Shifting conveyers or other transport devices from one location at the working face to another (guiding mining machines along conveyers for the cut mineral [E21C 35/12](#); in combination with mine roof supports for step-by-step movement [E21D 23/00](#))
- E21F 13/083 . . {Conveyer belts removing methods or devices }
- E21F 13/086 . . {Armoured conveyers shifting devices }
- E21F 13/10 . Anchorings for conveyers
- E21F 15/00** **Methods or devices for placing filling-up materials in underground workings** (dams [E21F 17/103](#); {chocks made of flexible containers filled with backfilling material [E21D 15/483](#) })
- E21F 15/005 . {characterised by the kind or composition of the backfilling material }
- E21F 15/02 . Supporting means, e.g. shuttering, for filling-up materials
- E21F 15/04 . . Stowing mats
Goaf wire netting
Partition walls
- E21F 15/06 . Filling-up mechanically
- E21F 15/08 . Filling-up hydraulically or pneumatically (hydraulic or pneumatic transport devices [B65G](#) ; pipes, pipe couplings [F16L](#))
- E21F 15/10 . . Hydraulic or pneumatic filling-up machines
- E21F 16/00** **Drainage** (keeping dry foundation sites or other areas in the ground [E02D 19/00](#))
- E21F 16/02 . of tunnels

- E21F 17/00** **Methods or devices for use in mines or tunnels, not covered elsewhere (mine lighting [F21](#) , [H05B](#))**
- E21F 17/02** . Suspension devices for tubes or the like, e.g. for ventilating ducts (supporting pipes, cables or protective tubing in general [F16L 3/00](#) to [F16L 7/00](#))
- E21F 17/04** . Distributing means for power supply in mines
- E21F 17/06** . . Distributing electric power
Cable networks
Conduits for cables (circuit arrangements for supplying or distributing electric power in general [H02J](#))
- E21F 17/08** . . Distributing hydraulic power
Pipe networks for hydraulic liquid (pipe-line systems in general [F17D](#))
- E21F 17/10** . . Distributing pneumatic power
Pipe networks for compressed air (pipe-line systems in general [F17D](#))
- E21F 17/103** . Dams, e.g. for ventilation
- E21F 17/107** . . inflatable
- E21F 17/12** . . Dam doors { (air doors [E21F 1/10](#); air locks [E21F 1/145](#)) }
- E21F 17/16** . Modification of mine passages or chambers for storage purposes, especially for liquids or gases (storing fluids in natural or artificial cavities or chambers in the earth [B65G 5/00](#))
- E21F 17/18** . Special adaptations of signalling or alarm devices (for mine lifts [B66B](#) ; gas-sensitive devices per se [G01N](#))
- E21F 17/185** . . {Rock-pressure control devices with or without alarm devices; Alarm devices in case of roof subsidence (props with load-measuring devices [E21D 15/46](#)) }